Electronic Version
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Claims

[c1] What is claimed is:

1. An image-capturing apparatus with error-detecting function, the image-capturing apparatus comprising:
a light sensor for sensing light reflected from an image and for transforming the light into an analog image signal;
an analog front-end device electrically connected to the light sensor for transforming the analog image signal into a digital image signal;
an encoder electrically connected to the analog front-end device for encoding the digital image signal transformed by the analog front-end device;
a decoder for decoding the encoded digital image signal encoded by the encoder;
a processor electrically connected to the decoder for determining whether the encoded digital image signal encoded by the encoder is correct or not and for generating a control signal to control the operations of the light sensor and the encoder; and
a signal transmission device electrically connected between the light sensor, the decoder, and the processor for transmitting the encoded digital image signal en-

coded by the encoder and the control signal generated by the processor.

[c2] 2. The image-capturing apparatus of claim 1, wherein the processor is to generate the control signal only if the processor has determined that the encoded digital image signal encoded by the encoded is not correct.

[c3] 3. The image-capturing apparatus of claim 1, wherein the control signal enables the light sensor to sense light reflected from another image.

[c4] 4. The image-capturing apparatus of claim 1 further comprising a register electrically connected between the analog front-end device and the encoder for storing the digital image signal transformed by the analog front-end device.

[c5] 5. The image-capturing apparatus of claim 4, wherein every time the analog front-end device transforms a new analog image signal into a new digital image signal, the analog front-end device updates the digital image signal stored in the register with the new digital image signal.

[c6] 6. The image-capturing apparatus of claim 5, wherein the control signal enables the encoder to encode the digital image signal stored in the register.

[c7] 7. The image-capturing apparatus of claim 1, wherein the encoder, the decoder, and the processor form an odd parity error-checking mechanism.

[c8] 8. The image-capturing apparatus of claim 1, wherein the encoder, the decoder, and the processor form an even parity error-checking mechanism.

[c9] 9. The image-capturing apparatus of claim 1, wherein the encoder, the decoder, and the processor form a cyclic-redundancy error-checking (CRC) mechanism.

[c10] 10. The image-capturing apparatus of claim 1, wherein the digital image signal comprises N bits, and the encoded digital image signal encoded by the encoder from the digital image signal comprises a check bit having a value set according to the N bits of the digital image signal and a predetermined error-checking mechanism formed according to the encoder, the decoder, and the processor, and N corresponding bit pairs, each of the bit pairs comprising an odd location bit and an even location bit equal to the odd location bit, and an odd location bit of an n_{th} bit pair of the encoded digital image signal having a value equal to that of an n_{th} bit of the digital image signal.

[c11] 11. The image-capturing apparatus of claim 10, wherein

the control signal is a null signal.

[c12] 12. The image-capturing apparatus of claim 10, wherein the predetermined error-checking mechanism is an odd parity error-checking mechanism.

[c13] 13. The image-capturing apparatus of claim 10, wherein the predetermined error-checking mechanism is an even parity error-checking mechanism.

[c14] 14. The image-capturing apparatus of claim 10, wherein the predetermined error-checking mechanism is a cyclic-redundancy error-checking mechanism.

[c15] 15. The image-capturing apparatus of claim 1, wherein the processor is an application-specific integrated circuit (ASIC).

[c16] 16. The image-capturing apparatus of claim 1, wherein the light sensor is a charge-coupled device (CCD).

[c17] 17. The image-capturing apparatus of claim 1, wherein the analog front-end device is installed in a light engine comprising the light sensor.

[c18] 18. The image-capturing apparatus of claim 1, wherein the encoder is installed in a light engine comprising the light sensor.

[c19] 19. The image-capturing apparatus of claim 1, wherein the analog front-end device is installed on a mother-board.

[c20] 20. The image-capturing apparatus of claim 1, wherein the encoder is installed on a motherboard.